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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/756,864	01/10/01	TANAKA	Y 49657-904

MCDERMOTT, WILL & EMERY
600 13TH STREET, N.W.
WASHINGTON DC 20005-3096

MM91/0629

EXAMINER

DICKEY, T	
ART UNIT	PAPER NUMBER

2826
DATE MAILED:

06/29/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/756,864

Applicant(s)

TANAKA ET AL.

Examiner

Thomas L Dickey

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 January 2001.
- 2a) ☐ This action is FINAL.
- 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 12-16 and 21-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 12-16 and 21-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- 15) ☒ Notice of References Cited (PTO-892)
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 17) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.

- 18) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 19) ☐ Notice of Informal Patent Application (PTO-152)
- 20) ☐ Other: _____.

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DETAILED ACTION

1. The preliminary amendments filed on 01/10/01, and 03/26/01 has been entered.

Oath/Declaration

2. The oath/declaration filed on 01/10/01 is acceptable.

Drawings

3. The formal drawings filed on 01/10/01 are acceptable.

Priority

4. Applicant has not complied with one or more conditions for receiving the benefit of an earlier filing date under 35 U.S.C. 120 as follows:

An application in which the benefits of an earlier application are desired must contain a specific reference to the prior application(s) in the first sentence of the specification (37 CFR 1.78). Applicants refer to their prior application 09/095912 in their IDS, but not in their specification.

Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Japan on 01/02/1997. It is noted, however, that the instant application was not filed within one year of applicant's foreign application as required by 35 U.S.C. 119(a), and further applicant has not filed a certified copy of the Japanese application as required by 35 U.S.C. 119(b).

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Information Disclosure Statement

5. The Information Disclosure Statement filed on 01/10/01 has been considered.

Specification

6. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Also, Applicant is reminded of the proper content of an abstract of the disclosure. A patent abstract is a concise statement of the technical disclosure of the patent and should include that which is new in the art to which the invention pertains. If the patent is of a basic nature, the entire technical disclosure may be new in the art, and the abstract should be directed to the entire disclosure. If the patent is in the nature of an improvement in an old apparatus, process, product, or composition, the abstract should include the technical disclosure of the improvement. In certain patents, particularly those for compounds and compositions, wherein the process for making and/or the use thereof are not obvious, the abstract should set forth a process for making and/or use thereof. If the new technical disclosure involves modifications or alternatives, the abstract should mention by way of example the preferred modification or alternative.

The abstract should not refer to purported merits or speculative applications of the invention and should not compare the invention with the prior art.

Where applicable, the abstract should include the following:

- (1) if a machine or apparatus, its organization and operation;
- (2) if an article, its method of making;

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(3) if a chemical compound, its identity and use;

(4) if a mixture, its ingredients;

(5) if a process, the steps.

In this case, the organization and operation of the claimed invention is not included from the abstract. Further, the phrase surrounding the words "beyond the upper surface" in line 12 is misleading as it refers to the invention claimed in the parent application.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 12-16 and 21-24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 12, in lines 5 and 6, includes the phrase "a capacitor lower electrode including first and second lower electrodes being adjacent to each other through a part of said insulating film." The specification does not disclose a single electrode having two parts, the parts being separated by part of the insulating film. Rather the specification discloses two distinct electrodes, being electrically isolated from each other by word-line controlled MOSFETS, the two distinct electrodes being adjacent to each other through a part of the insulating film. Further, lines 10-14 of claim 12 recite "a capacitor lower elec-

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trode ... opposition to said capacitor upper electrode..." This phrase appears redundant in that the upper electrode must be formed on the lower electrode through a dielectric film in any case, to satisfy the previous clause.

The examiner cannot determine the metes and bounds of the limitations thus sought to be included in the claimed invention.

In claim 4, line 3, "or" is indefinite because the term denotes alternatively different structures.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 12, 14, and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by GONZALEZ et al. (5,168, 073).

Gonzalez et al. discloses a memory cell region and peripheral circuit region comprising a semiconductor substrate 3 having a major surface, an insulating film 75 having an upper surface 114, being formed on the semiconductor substrate 3 to extend from the memory circuit to the peripheral circuit, first and second capacitor lower electrodes 90 being adjacent to each other through the insulating film 75, being formed on the surface of the semiconductor substrate 3 and extending to a vertical position substan-

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tially identical to the upper surface of the insulating film 75 in the memory region, and a capacitor upper electrode 120 formed on the capacitor lower electrode 90 through a dielectric film 115 to extend onto the upper surface 114 of the insulating film 75. Note figures 6 and 10, and col. 5 l. 60 of Gonzalez et al.

With regard to claim 14, Gonzalez et al. discloses that the insulating film includes upper insulating film 75 made of BSPG and lower insulating film 40 made of oxide, the two layers, on account of being made of different materials, being different in etching rate from each other. Note figure 10 of Gonzalez et al.

With regard to claim 15, Gonzalez et al. discloses the dielectric film 115 is formed between the entire side surface of the capacitor lower electrode 90 and the insulating film 75. For this reason it is formed "at least" either a side surface or only a part of the bottom surface of the capacitor lower electrode 90 and the insulating film 75. Note figures 10 of Gonzalez et al.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

A. Claims 13, 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over GONZALEZ et al. (5,168, 073) in view of WANG et al. (5,856,220).

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Gonzalez et al. discloses all the limitations of claims 21-23 except that the part of the insulating film between adjacent first and second electrodes have a width smaller than the minimum working size formable by photolithography. Note figure 10 of Gonzalez et al.

However, Wang et al. discloses a method whereby isotropic etching cuts through the insulating film in a pair of hemispherical cuts to produce a pair of adjacent lower electrodes. The width of the part of the insulating film this method leaves between the adjacent electrodes is wholly independent of the limits of photolithography. The width may be zero, or any number larger than zero. Note figure 12 of Wang et al. Therefore, it would have been obvious to a person having skill in the art to reduce wasted space occupied by part of the insulating film by replacing the two dimensionally patterned, lithographically size restricted cylindrical lower electrodes of Gonzalez et al.'s device with the hemispherical, free form etched lower electrodes such as taught by Wang et al. in order to increase electrode area to thus provide higher capacitance.

Gonzalez et al. discloses all the limitations of claim 13 except that a side surface of the capacitor lower electrode has a curved plane. Note figure 10 of Gonzalez et al.

However, Wang et al. discloses a method which produces a lower electrode with hemispherical, curved side planes. Note figure 12 of Wang et al. Therefore, it would have been obvious to a person having skill in the art to replace the cylindrical side planes of Gonzalez et al.'s lower electrode with the hemispherical, curved side planes

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such as taught by Wang et al. in order to increase electrode area to thus provide better higher capacitance.

B. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over GONZALEZ ET AL. (5,168, 073) in view of NAKANO (JP 06125051).

Gonzalez et al. discloses all the limitations of claim 16 except that the capacitor lower electrode comprise granular crystals on its surface. Note figure 10 of Gonzalez et al.

However, Nakano discloses stack type DRAM capacitor with an undulating surface due to its granularity. Note figure 1d of Nakano. Therefore, it would have been obvious to a person having skill in the art to replace the smooth surfaced lower electrode of Gonzalez et al.'s DRAM capacitor with the lower electrode having an undulating surface due to its granularity such as taught by Nakano in order to increase effective electrode area to thus provide higher capacitance.

C. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over GONZALEZ et al. (5,168, 073) in view of WANG et al. (5,856,220).as applied to claim 21 above, and further in view of the admitted prior art.

Gonzalez et al. and Wang et al. discloses all the limitations of claim 16 including a "hard" oxide peripheral circuit element protection film 40 disclosed by Gonzales et al., except that the capacitor upper electrode extends towards the peripheral circuit, and to provide an upper interlayer isolation film with a contact hole formed therein on the capacitor upper electrode. Note figure 10 of Gonzalez et al. and figure 12 of Wang et al.

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However, the admitted prior art discloses a stack type DRAM capacitor with the upper capacitor electrode 1151 extended towards the peripheral circuit, and which provides an upper interlayer isolation film 1205 disposed over the upper capacitor electrode 1151, with a contact hole 1135 formed therein on the capacitor upper electrode 1151. Note figure 117 of the admitted prior art. Therefore, it would have been obvious to a person having skill in the art to extend the upper electrode of Gonzalez et al. and Wang et al.'s DRAM capacitor towards the peripheral circuit, and to provide an upper interlayer isolation film with a contact hole formed therein on the capacitor upper electrode, along with a peripheral circuit element protection film formed under the insulating film such as taught by the admitted prior art in order to allow electrical access to the upper capacitor electrode in the peripheral region and allow the contact hole to be made by a non-critical etch step to thus provide more efficient manufacture.

Conclusion

10. Papers related to this application may be submitted to Technology Center (TC) 2800 by facsimile transmission. Papers should be faxed to TC 2800 via the TC 2800 Fax center located in Crystal Plaza 4, room 3-C23. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The Group 2826 Fax Center number is (703) 308-7722 and 308-7724. The Group 2800 Fax Center is to be used only for papers related to Group 2800 applications.

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Any inquiry concerning this communication or any earlier communication from the Examiner should be directed to Thomas Dickey whose telephone number is (703) 308-0980. The Examiner is in the Office generally between the hours of 8:00 AM to 5:00 PM (Eastern Standard Time) Monday through Friday.

Any inquiry of a general nature or relating to the status of this application should be directed to the **Technology Center Receptionists** whose telephone number is 308-0956.

TLD

06/2001


Minh Loan Tran
Primary Examiner